

The claimed invention is:

1. A method of injection molding a part having an undercut region, said method comprising the steps of:
  - (a) providing a two-part mold, a first part of said mold having a first portion of a single cavity and a second part of said mold having a second portion of said single cavity whereby said first and second portions form said single cavity when the mold is closed;
  - (b) providing a first pin in one of said mold parts, said pin extending into said cavity portion in said one mold part in order to form a portion of a bore in said molded part in said cavity, said pin having a portion shaped to form a first undercut region in said bore;
  - (c) providing a second pin in the other of said two mold parts, said second pin extending into said cavity portion in said other mold part in order to form another portion of said bore in said molded part, said second pin having a portion shaped to form a second undercut region in said bore, said two pins being aligned to form a single bore in said molded part;
  - (d) closing said mold and injecting molten material into said single cavity;
  - (e) providing a sequence of operations of said pins responsive to an opening of said mold:
    - (i) a first of said operations causing said molded part to be ejected from the portion of said cavity in the first mold part while being held by said first and second pins;

10 (ii) a second of said operations allowing said molded part to release said molded part from said first pin;

15 (iii) a third of said operations causing said molded part to be ejected from the portion of said cavity in the second mold part while being held by said second pin; and

20 (iv) a fourth of said operations allowing said molded part to release said molded part from said second pin.

2. The method of claim 1 wherein said second of said operations causes said molded part to be released from said first pin.

10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100 105 110 115 120 125 130 135 140 145 150 155 160 165 170 175 180 185 190 195 200 205 210 215 220 225 230 235 240 245 250 255 260 265 270 275 280 285 290 295 300 305 310 315 320 325 330 335 340 345 350 355 360 365 370 375 380 385 390 395 400 405 410 415 420 425 430 435 440 445 450 455 460 465 470 475 480 485 490 495 500 505 510 515 520 525 530 535 540 545 550 555 560 565 570 575 580 585 590 595 600 605 610 615 620 625 630 635 640 645 650 655 660 665 670 675 680 685 690 695 700 705 710 715 720 725 730 735 740 745 750 755 760 765 770 775 780 785 790 795 800 805 810 815 820 825 830 835 840 845 850 855 860 865 870 875 880 885 890 895 900 905 910 915 920 925 930 935 940 945 950 955 960 965 970 975 980 985 990 995 1000 1005 1010 1015 1020 1025 1030 1035 1040 1045 1050 1055 1060 1065 1070 1075 1080 1085 1090 1095 1100 1105 1110 1115 1120 1125 1130 1135 1140 1145 1150 1155 1160 1165 1170 1175 1180 1185 1190 1195 1200 1205 1210 1215 1220 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10 (f) completing the ejection of said molded part after it is released from  
the hold of the cavity.

5. The method of claim 4 further comprising the steps of providing said mold  
5 with two plates forming said cavity with a parting line, providing two moving parts in said  
mold, one of said moving parts of said mold being located in said cavity above said  
parting line and another of said two moving parts of said mold being located in said  
cavity below said parting line; said two moving parts in said cavity being aligned to form  
a bore in said part molded in said cavity; and forming a portion on each of said moving  
parts in order to form an undercut in said bore at each end of said molded part.

10 6. The method of claim 5 wherein said bore extends completely through said  
molded part.

15 7. The method of claim 5 wherein said material has a good memory and  
flexibility characteristic.

8. The method of claim 5 wherein said material is polyoxymethylene.

20 9. The method of claim 5 further providing said mold with a hole of a limited  
depth for each of said moving parts of said mold, said limited depth hole enabling said  
mold to open a discrete distance without moving said moving parts relative to said

molded part and for moving said moving parts after said mold opens beyond said discrete distance.

10. A method of assembling a structure from several parts, said method  
5 comprising the steps of:

(a) providing two separate types of parts, a first of said types of parts having at least two oppositely disposed balls and the second of said types of parts having at least two oppositely disposed sockets, any one of said balls and any one of said sockets sized and shaped to form a ball and socket joint;

10 (b) providing a plate having at least one groove therein, said groove being dimensioned to receive said parts and formed in the configuration of said structure;

(c) placing said parts in said groove with said first and second types of parts alternating with each other, whereby each ball confronts a socket;

15 (d) covering said groove to prevent a displacement of said parts from said groove; and

(e) simultaneously applying pressure on opposite ends of said groove for forcing said balls into said sockets, thereby forming an assembled linkage of said parts joined by ball and socket joints.

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11. The method of claim 10 wherein said fixture has two intersecting grooves, and the further steps of providing a third part for placing at the intersection of said two grooves, said third part adapted to form a ball and socket joint with each part which it

confronts, and two sets of said pressure applying means, a first set of said pressure applying means simultaneously applying pressure at opposite ends of one of said intersecting grooves, and a second set of said pressure applying means simultaneously applying pressure on opposite ends of the other of said intersecting grooves.

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12. The method of claim 11 and the further steps of providing a toy or doll body configured to receive and be supported by said assembled linkage of parts, placing the assembled linkage in said body and providing couplers for connecting said linkage of parts to said body.

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13. The method of claim 10 wherein said first of said types of parts has a dumbbell-shaped rod with a ball on each end and a second of said types of parts is a sleeve with a central bore with sockets at each end of the bore, said sockets having dimensions such that said balls are captured in said sockets to form said ball and socket joints.

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14. A mold for molding a part, said mold comprising two plates forming a shared cavity for molding said part, at least one pin in said cavity, and at least one of said plates including a hole for providing therein a limited travel for said pin, said pin having a shape for molding an undercut region in said part molded in said cavity, said hole enabling said mold to partially open without pulling said pin from said undercut region until said part has been released from the cavity, and means responsive to a

complete opening of said mold for pulling said pin from said undercut region after said part has been released from the hold of the mold cavity.

15. The mold of claim 14 wherein there are two of said pins, one pin being

5 associated with one of said plates and the other of said pins being associated with the other of said plates and said part is retained on said first pin after leaving the first mold cavity for further mold release and on said second pin after leaving the second mold cavity before being ejected from said mold.

10 16. A method for assembling an end product from several parts, said method comprising the steps of:

(a) providing at least two separate types of parts, a first of said parts having at least two oppositely disposed balls and the second of said parts having two oppositely disposed sockets, any one of said balls and any one of said sockets together forming a ball and socket joint;

(b) providing a plate having at least one groove therein, said groove being dimensioned to receive said parts and being formed in the configuration of a desired end product with said first and second types of parts alternating with each other in said groove, whereby each ball confronts a socket;

20 (c) preventing displacement of said parts from said groove; and

(d) applying pressure on at least one end of said groove for forcing said balls into said sockets, thereby forming an assembly of said parts joined by ball and socket joints.

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17. The method of claim 16 including applying pressure simultaneously on opposite ends of said groove.

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18. A support system comprising:

(a) a plurality of rods, each rod having a first end and a second end;  
(b) a plurality of sleeves, each sleeve including first and second sockets, said sockets configured to movably receive and retain one of a first or second end of one of said rods;

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(c) said sleeves and rods forming a linkage of alternating sleeves and rods wherein a first socket of a first sleeve movably retains the first end of a first rod, and the second socket of a second sleeve movably retains the second end of said first rod;  
(d) a cover substantially surrounding said support system; and  
(e) at least one coupler for securing the cover to said support system.

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19. The support system of claim 18 further comprising a crosspiece having at least three ends, each one of the ends adapted to be movably received by one of three separate sleeve sockets.

20. The support system of claim 18 further comprising a crosspiece having at least four ends, each one of the ends adapted to be movably received by one of four separate sleeve sockets.

21. The support system of claim 18 wherein said linkage forms a jointed skeleton of a posable figure having arms, legs and a body.

5 22. The support system of claim 18 wherein said linkage forms a jointed skeleton of a posable figure having arms, legs, a body and a tail.

10 23. The support system of claim 21 further comprising at least one end piece located at a distal end of at least one of said arms and legs.

24. The support system of claim 18 wherein said sockets are formed by an undercut region adjacent to the ends of the sleeves.

25. The support system of claim 18 wherein said linkage forms a posable figure having a plurality of bendable limbs.

26. The support system of claim 25 further comprising an outer cover substantially surrounding said linkage.

20 27. The support system of claim 26 wherein said cover comprises a plush fabric.

28. The support system of claim 26 wherein said cover comprises a vinyl fabric.

29. The support system of claim 21 further comprising a battery, an optical fiber on an exterior part of said body and a lamp connected to said battery via a 5 magnetic switch, said lamp being positioned near said optical fiber to light said fiber.

30. The support system of claim 29 further comprising a magnetic switch connected between said battery and said lamp.

31. The support system of claim 30 wherein said magnetic switch is operable by a magnet placed in proximity to said switch.

32. The support system of claim 29 wherein said body is a toy animal and further comprising a plurality of said optical fibers arranged to simulate hair or fur of the animal.

33. The support system of claim 18 further comprising an electrical switch actuated by movement of said first rod relative to said first sleeve.

34. The support system of claim 33 wherein said switch comprises a first contact element associated with said sleeve, and a second contact element associated

with said rod, wherein angular movement of said rod relative to said sleeve causes said second electrical contact to physically engage said first electrical contact.

35. The support system of claim 34 wherein said first electrical contact  
5 comprises a conductive annular ring adjacent said first socket of said first sleeve.

36. The support system of claim 35 further comprising a conductive shaft  
extending axially through said first rod, the shaft having first and second ends  
corresponding to the first and second ends of the rod and a spring mounted to the first  
10 end of the shaft and extending from the first end of the rod, said second contact being  
mounted on a distal end of said spring.

37. The support system of claim 36 further comprising a first electrical lead  
extending from said first sleeve, said first electrical lead connected to said first contact  
element, and a second electrical lead extending from the second end of said conductive  
shaft, said second electrical lead being in electrical contact with said second contact  
element through said shaft and spring.

38. A method for assembling a structure from several parts, the method  
20 comprising the steps of:

(a) providing at least two discrete parts, each part having two ends with  
each end adapted to be joined to at least one cooperating end of the other part to form  
a joint between the parts;

5 (b) providing a means for receiving said parts in the configuration of said structure with the cooperating ends of said parts confronting each other;

(c) placing said parts in said receiving means in alignment to form said configuration of said structure with the cooperating ends of said parts confronting each other; and

(d) providing a means for forcing the cooperating ends of said parts together to form joints which link the parts, thereby forming an assembly of said parts into said structure.

10 39. A ball and socket joint having an electrical switch actuated by relative movement across the joint, said joint comprising

(a) a sleeve having a first undercut region forming a socket;

(b) a rod having a first end forming a ball adapted to be received in said socket;

(c) a first contact element associated with the sleeve, and a second contact element associated with the rod;

(d) said first and second contact elements being positioned such that angular motion of said rod relative to said sleeve greater than an actuation angle causes said second contact element to physically engage said first contact element

20 thereby closing the switch.

40. The ball and socket joint of claim 39 wherein said first contact element comprises a conductive annular ring adjacent said socket.

41. The ball and socket joint of claim 40 further comprising a conductive shaft extending axially through said first rod, the shaft having first and second ends, a spring mounted to the first end of the shaft and extending from the rod, said second contact element being mounted on a distal end of said spring.

42. The ball and socket joint of claim 41 further comprising a first electrical lead extending from said first sleeve, said first electrical lead connected to said first contact element, and a electrical lead extending from the second end of said conductive shaft, said second lead being in electrical contact with said second contact element through said shaft and spring.